

# [ELECTRO-STATIC DISCHARGE PROTECTION CIRCUIT FOR DUAL-POLARITY INPUT/OUTPUT PAD]

## Abstract

An electro-static discharge (ESD) protection circuit for a dual polarity I/O pad is provided. The protection circuit includes a substrate of first type; a deep well region of second type disposed in the first type substrate; a well region of first type disposed in the second type deep well region; a first transistor disposed over the well region of first type, wherein the first transistor has a first source, a first gate and a first drain; a second transistor disposed over the substrate of first type, wherein the second transistor has a second source, a second gate and a second drain, and the second source is connected with the first drain, and both of them are disposed in a portion of the well region of first type, the deep well region of second type and the substrate of first type; a first doped region is disposed in the first type well region and laterally adjacent to the first source; a second doped region is disposed in the substrate of first type and laterally adjacent to the second drain.